Paper No. 32

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte NAOYOSHI KAURAGAKI

Appeal No. 1996-3675
Application No. 08/259,933

HEARD: November 16, 2000

Before JOHN D. SMITH, WARREN, and DELMENDO, Administrative Patent Judges.

DELMENDO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the examiner's refusal to allow claims 1, 2, 8, 11, 15, and 16 as amended subsequent to the final rejection. The examiner indicated that claims 4 through 6, 9, 10, and 12 through 14, which are the only other claims pending in the application, "would be allowable in independent form" (Paper 19; advisory action of August 23, 1995).

Claims 1 and 16 are illustrative of the claims on appeal and are reproduced below:

> 1. A reference electrode construction for an electrically powered marine propulsion unit corrosion protection system, said reference electrode comprising an electrode wire having an outer surface formed of material which is soluble in a body of water in which said reference electrode is immersed, an elongated surrounding protective covering having a V-shaped portion at least partially enclosing a V-shaped section of said electrode wire and defining a small volume therebetween, said outer surface material of said electrode wire being sufficiently dissolvable in the volume of water between said protective covering and said electrode wire to produce a saturated solution of said outer surface material when said reference electrode is placed in the body of water, and a plurality of fluidic openings which open into said small volume defined between said electrode wire and said covering.
>
> 16. A reference electrode construction for an electrical corrosion protection system adapted for use with a marine propulsion unit, said reference electrode comprising an electrode wire having an outer surface of material that is soluble in a body of water in which said reference electrode is immersed, an elongated surrounding protective covering which encloses at least a portion of the electrode wire and defines a small space therebetween, said outer surface material of said electrode wire being sufficiently dissolvable in the volume of water between said protective covering and said electrode wire to produce a saturated solution of said outer surface material when said reference electrode is placed in the body of water, and a plurality of fluidic openings which open into the

small space defined between said electrode wire and said covering.

The subject matter on appeal relates to a reference electrode arrangement for a cathodic protection system of a marine propulsion unit (appeal brief, page 3). According to the appellant (*id*.), the reference electrode includes an electrode wire within an elongated protective covering which includes a plurality of openings. The appellant states that the openings open into a small volume defined by the protective covering and the electrode wire and that the outer material of the electrode wire dissolves in the water, saturating the solution surrounding the electrode wire with an electrolyte comprising the electrode outer material (*id*.). The appellant further states that the saturated solution inhibits further electrode dissolution, thus prolonging the life of the electrode (*id*.).

As evidence of unpatentability, the examiner relies upon the following prior art references:

Watanabe et al. (Watanabe)	3,455,793	Jul. 15, 1969
Kuo et al. (Kuo)	4,163,698	Aug. 07, 1979

Monter et al. (Monter)	4,290,872	Sep. 22, 1981
Staerzl	4,492,877	Jan. 08, 1985
Miles et al. (Miles)	4,500,402	Feb. 19, 1985

Claim 16 stands rejected under 35 U.S.C. § 103 as unpatentable over the combined teachings of Watanabe and Monter (examiner's answer, pages 3-4). Further, claims 1, 2, 8, and 11 stand rejected under 35 U.S.C. § 103 as unpatentable over the combined teachings of Watanabe, Monter, Kuo, and Miles (examiner's answer, pages 4-5). Additionally, claim 15 stands rejected under 35 U.S.C. § 103 as unpatentable over the combined teachings of Staerzl, Watanabe, Monter, Kuo, and Miles (examiner's answer, page 5).

We have carefully reviewed the entire record, including all of the arguments and evidence advanced by both the examiner and the appellant in support of their respective positions. This review leads us to conclude that the examiner's rejections are not well founded. Accordingly, we reverse all of the aforementioned rejections. The reasons for our determination follow.

All of the examiner's stated rejections rely on the combination of Watanabe and Monter. Specifically, the examiner's position is stated as follows:

> Watanabe discloses a conventional Ag-AgCl reference electrode 38, whose surrounding electrolyte 42 is saturated with AgCl to ensure a constant concentration. Electrode 38 is a wire and tube 10 is seen to be an elongated surrounding covering. Element 32 serves as a liquid junction. See col. 3, l. 13-29. Applicant's claim differs from Watanabe by calling for a plurality of openings leading to the space between the electrode and the covering and the covering serving as the liquid junction [sic].
>
> Monter discloses a reference electrode 12 surrounded by an elongated covering 14, which has a plurality of openings 16 serving as the liquid junction. See col. 3, lines 13-48. <u>It would be obvious for Watanabe to replace its liquid junction 32 with a plurality of openings because the substitution of art-recognized equivalents is within the skill of the art.</u>
>
> If Watanabe is construed as not to disclose a wire electrode surrounded by an elongate[d] covering, claim 16 differs further in that respect.
>
> Monter clearly shows an elongated electrode surrounded by an elongate[d] covering. <u>It would be obvious for Watanabe to adopt this electroded [sic] configuration, because this configuration allows the electrode to fit into narrow spaces and to cover extended surfaces.</u> [Underscoring added; examiner's answer, pp. 3-4.]

The appellants, on the other hand, argue as follows:

> One skilled in the art, therefore, would not be motivated to modify the reference electrode of Watanabe to include multiple openings as the

> Examiner suggests because exposure of the internal half cell 32 to water would defeat the purpose of the Watanabe invention. The unsupported position taken by the Examiner is contrary to the specific teaching of Watanabe, Watanabe, when considered as a whole, does not supply any motivation to incorporate multiple holes into the reference electrode, and specifically teaches away from the structure suggested by the Examiner. Some teaching or suggestion in the references must exist to support their use of the particular applied combination. In combining Watanabe and Monter, the Examiner has impermissibly selected only so much of these references as necessary to support the Examiner's position. The Examiner has ignored the teachings of these references which would lead one skilled in the art away from making the suggested combination. The suggested combination of elements of these references, therefore, is improper. [Underscoring added; appeal brief, pp. 11-12.]

We agree with the appellant that the examiner has not supplied the requisite teaching or motivation to combine Watanabe with Monter. Our reviewing court has made it clear that "the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references." In re Dembiczak, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999) (citing C.R. Bard, Inc. v. M3 Sys., Inc., 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232 (Fed. Cir. 1998)).

Here, the examiner alleges that the liquid junction (or leak structure) 32 described in Watanabe and the holes 16 described in Monter are "art-recognized equivalents." However, the evidence does not support the examiner's allegation.

Watanabe teaches a reference electrode for measuring the pH of high purity at elevated temperatures comprising two liquid junctions, wherein a first liquid junction communicates a silver- chloride internal half cell immersed in a silver chloride saturated potassium chloride solution disposed in an inner tube with a pure potassium chloride solution disposed in an outer tube and a second liquid junction communicates the pure potassium chloride solution with a test sample external to the outer tube (column 1, lines 14-23). According to Watanabe, the function of the liquid junction 32 is to provide an electrical connection between the salt bridge solution (i.e., the saturated potassium chloride solution in the inner tube) and the sample or test solution by liquid contact (column 1, lines 42-52). Watanabe teaches that the liquid junction 32 should permit only a relatively low flow rate, because a high flow rate would require frequent replenishment

of the salt bridge solution and would contaminate the high purity water (column 1, line 54 to column 2, line 26). Although Watanabe states that precipitates of insoluble AgCl and Cl^- can clog the liquid junction and sufficiently high flow rate can wash away the precipitates, Watanabe proposes the use of a pressure differential to prevent the flow of the salt bridge solution in the inner tube to the outer tube (column 2, lines 44-57).

By contrast, Monter discloses a high temperature hydrogen reference electrode which is formed from a closed end tube of palladium-silver alloy pressurized on the inside with pure hydrogen gas (column 2, lines 18-23). Monter further teaches that the alloy tube is loosely encased in a lightly perforated sleeve which allows liquid such as water to be trapped between the alloy tube and the sleeve where the water is saturated with hydrogen permeating through the wall of the alloy tube (column 2, lines 23-27). According to Monter, the high temperature hydrogen reference electrode may be used in measuring systems for determining the percentage of dissolved oxygen in high temperature water on the secondary side of a pressurized water reactor system in the approximate

temperature range of 450EF to 600EF (column 1, lines 17-21; column 2, lines 10-15). Unlike Watanabe, Monter teaches against using a silver-silver chloride alloy as the electrode material (column 1, line 47 to column 2, line 9). Also, unlike Watanabe, Monter teaches that holes 16 "allow water to be communicated through the sleeve" (column 3, lines 63-65).

We do not find any teaching, motivation, or suggestion to combine Watanabe with Monter as proposed by the examiner. Nothing in these references suggests that the liquid junction 32 of Watanabe and the holes 16 of Monter are "art-recognized equivalents." Nor is there any teaching, suggestion, or motivation to use the high temperature hydrogen reference electrode of Monter in Watanabe as alleged by the examiner. Contrary to the examiner's position, we determine that each of these applied prior art references diverges from and in fact teaches away from the appellant's claimed invention. W.L. Gore & Assoc., Inc. v. Garlock, Inc ., 721 F.2d 1540, 1550, 220 USPQ 303, 311 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984) (holding that it is error to find obviousness where the prior art references "diverge from and teach away from the invention at hand").

As we discussed above, all of the examiner's rejections rely on the combination of Watanabe and Monter. Because the combination of Watanabe and Monter is not tenable, we agree with the appellant that one of ordinary skill in the art would not have found the subject matter of the appealed claims to be obvious over the applied prior art references within the meaning of 35 U.S.C. § 103.

For these reasons, we reverse the examiner's (1) rejection of claim 16 under 35 U.S.C. § 103 as unpatentable over the combined teachings of Watanabe and Monter, (2) rejection of claims 1, 2, 8, and 11 under 35 U.S.C. § 103 as unpatentable over the combined teachings of Watanabe, Monter, Kuo, and Miles, and (3) the rejection of claim 15 under 35 U.S.C. § 103 as unpatentable over the combined teachings of Staerzl, Watanabe, Monter, Kuo, and Miles.

The decision of the examiner is reversed.

REVERSED

JOHN D. SMITH)

Administrative Patent Judge	)	
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	)	BOARD OF PATENT
CHARLES F. WARREN	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
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ROMULO H. DELMENDO	)	
Administrative Patent Judge	)	

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